This manuscript applies two methods for studying rockfall activity in the Lauterbrunnen valley. Coupling seismic monitoring and terrestrial laser scanning (TLS) allows a good resolution in time and space, and allows the detection of very small rockfalls. TLS data is used to validate the seismic detection and location method.
While seismic monitoring and TLS have been frequently used, coupling both methods is innovative and interesting.
The authors obtain impressive results in terms of location accuracy and sensitivity.
For these reasons this manuscript is very worth publishing in ESDD.
But some changes should be made to clarify a few points.

-- Main points

- Detection and classification of seismic events

p6-7. Events detected at different stations are considered to be the same event if the time delay between stations is less than 1.75 s corresponding to an S wave with a velocity of 2000 m/s.
I suggest increasing this value to about 10 s, because it is likely that some stations may detect the detachment phase, while other stations may only be triggered by the impact at the cliff base. Another possibility is to merge events at different stations if there is some overlap in time between the signals.

p13: Events longer than 20 s are removed because this is longer than the expected rockfall propagation.
But rockfalls frequently occur in sequences of events, so that this constrain may remove true rockfall events.

Here are a few ideas to distinguish automatically earthquakes and rockfalls :
- Did you use earthquake catalogs to remove earthquakes?
- The variability of amplitude among stations should be higher for rockfalls (or other nearby sources) than for earthquakes
- The time delay between stations should be smaller for earthquakes and other distant sources (deep source implying a higher apparent velocity).

- Location.

P7, l30. You should also cite here Lacroix and Helmstetter (2011) who used a very similar method to locate rockfalls (using the seismic waveforms rather than the signal envelope)

p8, l30. I do not understand "Locations with a likelihood quantile below 0.95 …"?
Do you mean that you select grid points with cross-correlation smaller than the 0.95 quantile of the distribution of the cross-correlation across the search area?
Or do you have a method to estimate the actual probability of a point to be the source location, e.g., as done by Lomax for the nonlinloc location algorithm?

I don't see the interest of adjusting the frequency range individually for each event. Of course, it makes the location error smaller.
By adjusting more parameters (time interval …) you could probably lower the location error event more …
But what do we learn from that?
Adjusting the velocity using all events makes sense, but adjusting one parameter for each event individually does not.
Even without optimizing the parameters based on known event location, the location accuracy is quite good considering the number of stations (between 4 and 6)!

Did you test your location method on synthetic signals?
For instance, you can take a real rockfall signal, and shift this signal in time by the difference in travel time to define the signal at the other stations, and add seismic noise.
This would provide an optimistic estimate of the location accuracy, because real signals are quite different from one station to another one. It can be useful to estimate the influence of errors on seismic wave velocity.

p17,l24 : The station spacing in your study is quite different from the study of Lacroix and Helmstetter (2011).
This study used antennas of 7-24 sensors, with distance between sensors inside an antenna of 20-50 m, and distances between antennas of several hundred meters.
Using shorter inter-sensor distance allows correlating the rockfall waveforms rather than their envelope and provides a better location accuracy.

- **Ambiguities in matching TLS and seismic events?**

p8l5. TLS locations are used to constrain the seismic wave velocity V used for locating the seismic events by minimizing the difference in location between TLS and seismic events.
Similarly, the frequency range used to filter the seismic signals is adjusted by minimizing the error with the TLS location.
But you already need an accurate location of the seismic events to associate seismic and TLS events!
Where did you start from? How did you deal with ambiguities? This part needs more explanations.

Maybe you could select the rockfall seismic signal with the largest amplitude and assume it corresponds to the largest volume detected by TLS, and adjust the seismic wave velocity for this event?
Then run the location with this velocity for all events, associate TLS and seismic events, and only latter re-optimize V for all events?

- Duration of events.
In figure 7, the duration of signals does not seem to match the duration listed in Table 2. For instance, events #7 and #9 have duration >30 s when looking at the spectrograms, but the duration listed in Table 2 is much shorter.

Could you add symbols in each PSD plot showing the start and end of each event?

- Interpretation of seismic signals : impact or detachment?
p19. A figure showing a profile of the cliff at the location of the rockfall would be useful to interpret the rockfall signal.
Does the topography of the cliff supports the hypothesis of an impact 1.7 s after the initiation phase?

I think that the first low-frequency peak ("phase 2") is more likely the detachment phase (elastic rebound) than an impact.
Indeed, I have seen such a signal for many rockfalls that occurred under a roof above an over-hanging cliff, with no possible impact before the cliff base, and with a time delay between the detachment phase and the impact at the base that is consistent with free fall.

You discuss only one event in section 6.3. What about the other 9 events?
Can you identify fracture, detachment, impact and/or propagation phases?
If you see both the detachment and impact phases, do you find a good agreement between the free fall height estimated from the seismic signal and from the source location?

-- Details

FIg 3: Add a scale bar and all plots

Fig 7 : For which station is the PSD computed?

Figure 5 : There are 5 solid lines corresponding to events with Pmax>0.94. But according to Fig 6 there should be 10 events with Pmax>=0.94?

Table 1 : can you add the number of available stations?

Table 2 : Could you also add magnitude (and/or amplitude range) for each rockfall?